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Horizon Scanning Technology Prioritising Summary

The use of SMS text messaging to improve outpatient attendance

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PRIORITISING SUMMARY

REGISTER ID: 000294

NAME OF TECHNOLOGY: SMS TEXT MESSAGING

PURPOSE AND TARGET GROUP: THE USE OF SMS TEXT MESSAGES TO IMPROVE OUTPATIENT ATTENDANCE

STAGE OF DEVELOPMENT (IN AUSTRALIA):

- | | |
|---|---|
| <input type="checkbox"/> Yet to emerge | <input type="checkbox"/> Established |
| <input type="checkbox"/> Experimental | <input type="checkbox"/> Established <i>but</i> changed indication or modification of technique |
| <input checked="" type="checkbox"/> Investigational | <input type="checkbox"/> Should be taken out of use |
| <input type="checkbox"/> Nearly established | |

AUSTRALIAN THERAPEUTIC GOODS ADMINISTRATION APPROVAL

- | | |
|--|-------------|
| <input type="checkbox"/> Yes | ARTG number |
| <input type="checkbox"/> No | |
| <input checked="" type="checkbox"/> Not applicable | |

INTERNATIONAL UTILISATION:

COUNTRY	LEVEL OF USE		
	Trials Underway or Completed	Limited Use	Widely Diffused
United Kingdom		✓	
Asia	✓		
Australia		✓	
New Zealand	✓		

IMPACT SUMMARY:

This prioritising summary investigates the implications of a program of sending reminders via SMS to reduce the number of missed appointments in outpatient clinics.

BACKGROUND

Failure on the behalf of patients to attend outpatient appointments is a significant and widespread problem in Australian hospitals. In addition to an inefficient use of clinical and administrative resources, patient non-attendance reduces revenue opportunities for hospitals, increases waiting times for new appointments and ultimately results in poorer health outcomes for patients (Downer et al 2006, Hodgson 2005). Some patients may require a second referral from their family doctor after missing an outpatient appointment, resulting in further resource wastage (Milne et al 2006).

A number of studies have investigated the reasons for patient non-attendance. Practice error, illness, transportation difficulties, family commitments and confusion over dates and times have all been offered as reasons for non-attendance (Neal et al 2005). The primary reason for non-attendance, however, appears to be simply forgetfulness of behalf of the patient (Neal et al 2005, Martin et al 2005, Milne et al 2006). If this is the case, reminder systems may offer a viable solution to the problem of patient non-attendance at outpatient clinics.

Various reminder systems have been trialled across a variety of clinical settings. Although postal letters and telephone calls have been shown to reduce non-attendance rates (see for example Reti 2003), the techniques do not provide a practical solution to the issue of patient non-attendance at outpatient clinics due to the significant costs involved. More recently, short message service (SMS) text messaging has emerged as a viable approach for delivering reminders to outpatients. SMS text messaging is a relatively new communication technology that allows mobile phone users to send a text message to another mobile phone. Provided the recipient is in an area of mobile phone coverage and has their mobile phone switched on, the text message is delivered in a matter of seconds. SMS text messaging offers a number of benefits over other more conventional communication techniques. SMS text messaging is cheaper and more efficient than sending a post letter, and less intrusive than a phone call. Mobile phone saturation levels (given by the proportion of the population who use a mobile phone) are particularly high in Australia, with an estimated 18.4 million active mobile services reported as of June 2005 (ACMA 2005). A further advantage of SMS text messaging is the ability for large batches of individualised text messages to be sent out at the one time.

CLINICAL NEED AND BURDEN OF DISEASE

Missed appointments are a persistent worldwide problem, with non-attendance rates between 5 and 42 per cent reported in the literature. Similar rates of non-attendance have been documented in Australia. In a recent study conducted at the Royal Children's Hospital in Melbourne, monthly non-attendance rates in an outpatient setting were found to vary between 22 and 28 per cent over a 12-month period (Downer et al 2005). A number of factors have been associated with patient non-attendance. Patients who miss appointments are more likely to be male, of lower socioeconomic status and of a younger age (Hamilton et al 2002). They are also less likely to own a car and more likely to be unemployed (Sharp & Hamilton 2001). Non-attendance has also been related to the length of time between referral and appointment, with longer waiting times associated with higher rates of non-attendance (Hamilton et al 2002).

DIFFUSION

The use of SMS text messaging for improving outpatient attendance is currently being trialled at the Royal Children's Hospital in Melbourne (personal communication,

Royal Children's Hospital). The hospital is routinely sending SMS reminders to all patients who have a scheduled outpatient appointment. At present the hospital is sending around 300 to 400 SMS reminders per day using an online message delivery system. It is unclear to what extent other hospitals throughout Australia are employing this type of reminder system.

COMPARATORS

Comparators to a program of sending out SMS text message reminders include sending out reminder letters, sending emails or phoning patients. Although they might achieve greater patient coverage in comparison to SMS text messages, reminder letters and phone calls have high unit costs and require significant resources to administer. While emails offer a cheap alternative as a mode of sending patient reminders, coverage and reliability issues limit their usefulness in reducing rates of non-attendance.

EFFECTIVENESS AND SAFETY ISSUES

To determine the effectiveness of a program of sending SMS reminders, Leong et al (2006) investigated the attendance rates of 993 patients requiring follow-up appointments across seven primary care clinics in Malaysia. In the study, patients were randomised into one of three groups: a control group in which no reminder was sent, an SMS reminder group and a mobile phone call group (level II intervention evidence). Patients in the two intervention groups received reminders 24 to 48 hours before their scheduled appointments. The information conveyed by the SMS reminder and the mobile phone call was similar. The attendance rates of control, SMS reminder and mobile phone call patients were 48.1, 59.0 and 59.6 per cent respectively. In comparison to the control group, patients in both the SMS and the mobile phone call groups reported significantly higher attendance rates ($p = 0.005$ and $p = 0.003$ respectively). The difference in attendance rates between the two intervention groups was not found to be significantly different however ($p = 0.874$). A cost effectiveness analysis revealed that the cost of sending an SMS per additional attendance gained (0.45 RM, A\$0.15) was somewhat lower than the cost associated with a mobile phone call reminder per additional attendance gained (0.82 RM, A\$0.29).

In a recent study, Milne et al (2006) evaluated the influence of SMS reminders on patient attendance at a large teaching hospital in Scotland. Attendance data were collected on a total of 16,400 appointments, of which 2,647 (16.1 per cent) SMS reminders were received. SMS reminders were sent to patients who had registered a mobile phone number with the hospital one working day in advance of their scheduled appointment (level III-2 intervention evidence). For the purpose of analysis, appointments were classified into new and follow-up appointments, with new appointments further divided into partial booking and non-partial booking categories. Partial booking refers to the process whereby the hospital issues an invitation for the patient to contact the hospital to confirm a suitable time for appointment. Follow-up

appointments were not scheduled under partial booking. Attendance rates for the three categories of patients are illustrated in Table 1.

Table 1 Attendance rates in Milne et al (2006)

Group	N	Received SMS (%)	Attendance rate: SMS	Attendance rate: no SMS	P-value
New appointments (non partial booking)	1,962	9.8	90.2	84.7	0.019
New appointments (partial booking)	2,787	29.3	96.6	94.8	0.026
Follow-up appointments	11,651	14.1	83.6	82.6	0.282

As the table illustrates, attendance rates were significantly higher for new patients receiving SMS reminders under both partial and non-partial booking ($p = 0.026$ and $p = 0.019$ respectively). SMS reminders did not significantly influence the rate of attendance in the follow-up group of patients however ($p = 0.282$).

In a recent trial conducted at the Royal Children's Hospital in Melbourne, SMS reminders were sent to 20,448 patients who had provided a contact mobile phone number and were scheduled to attend an appointment between October and December 2004 (Downer et al 2006). SMS reminders were sent to these patients three working days before their scheduled appointment date. Attendance rates in this intervention group were compared to attendance rates in a historical group in which no reminders were issued (level III-3 intervention evidence). The historical group consisted of 18,073 patients who had provided mobile phone numbers and were scheduled to attend an appointment between October and December 2003. Attendance rates for the two groups, stratified by appointment type (new or follow-up), are presented in Table 2.

Table 2 Attendance rates in Downer et al (2006)

Appointment type	SMS group (Oct-Dec 2004)		Historical group (Oct-Dec 2003)		Increase in attendance rate (%)
	N	Attendance rate (%)	N	Attendance rate (%)	
New appointments	4,474	90.8	4,357	85.3	5.5*
Follow-up appointments	15,974	90.1	13,716	79.1	11.6*
Total	20,448	90.2	18,073	80.5	9.7*

* $p < 0.001$

As the table demonstrates, attendance rates were higher in the SMS reminder group for patients attending both new and follow-up appointments. Overall, SMS reminders were associated with a 9.7 per cent increase in attendance rate (90.2% vs. 80.5%, $p < 0.001$). Some questions regarding the validity of results should be raised however given the biases associated with the use of a historical comparison group.

COST IMPACT

In addition to assessing the effectiveness of SMS reminders in reducing patient non-attendance rates, Downer et al (2006) conducted a brief cost-effectiveness analysis in their study. A total of 22,658 messages were sent between October and December 2004 at a cost of \$0.22 per message. After factoring in salary costs for physically sending the messages, each SMS reminder was found to cost \$0.23. Given the overall increase in attendance of 9.7 per cent reported in the study, the cost of sending an SMS per additional attendance was calculated to be \$2.37. Applying the attendance rates to the historical group, the authors calculated a hypothetical 11.5 per cent total increase in revenue for the control period if SMS reminders had been sent.

ETHICAL, CULTURAL OR RELIGIOUS CONSIDERATIONS

No issues were identified/raised in the sources examined.

OTHER ISSUES

The successful adoption of a program of sending SMS text message reminders depends largely on the extent to which patients are familiar with and use the technology. Although mobile phone saturation levels are high in Australia, there are some subgroups within the community that are potentially less likely than others to have access to or feel comfortable using SMS text messages. Older patients are generally less familiar with mobile phone technology and may be reluctant or unable to receive SMS reminders (Hodgson 2005). It has also been suggested that mobile phones are less accessible to individuals of low socioeconomic status (Fahey 2003). This may have important implications to a program of sending SMS reminders, particularly given the reported association between low socioeconomic status and non-attendance at outpatient appointments (Hamilton et al 2002).

CONCLUSION:

A program of sending SMS reminders appears to be a relatively simple and cost-effective tool for reducing non-attendance rates at outpatient clinics. In Australia such a program appears feasible given the high levels of mobile phone saturation and the availability of online message creation/delivery systems through most Australian mobile service providers.

HEALTHPACT ACTION:

Given the successful implementation of SMS reminders at the Royal Children's Hospital in Melbourne, it is unlikely that any further health technology assessment would be beneficial. Although HealthPACT has recommended that further assessment of this technology is no longer warranted, the contents of this summary should be disseminated to inform all CEOs of major public hospitals of the effectiveness of a systematic reminder programme.

SOURCES OF FURTHER INFORMATION:

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- Fahey, D. (2003). 'Reminding patients by text message: text reminders could lead to increased health inequalities', *Bmj*, 327 (7414), 564.
- Hamilton, W., Round, A. & Sharp, D. (2002). 'Patient, hospital, and general practitioner characteristics associated with non-attendance: a cohort study', *Br J Gen Pract*, 52 (477), 317-319.
- Hodgson, Y. (2005). *Short message service as a support tool in medication adherence and chronic disease management* [Internet]. Health Care & Informatics Review Online. Available from: <http://hcro.enigma.co.nz/website/index.cfm> [Accessed 27th January 2007].
- Leong, K. C., Chen, W. S. et al (2006). 'The use of text messaging to improve attendance in primary care: a randomized controlled trial', *Fam Pract*, 23 (6), 699-705.
- Martin, C., Perfect, T. & Mantle, G. (2005). 'Non-attendance in primary care: the views of patients and practices on its causes, impact and solutions', *Fam Pract*, 22 (6), 638-643.
- Milne, R. G., Horne, M. & Torsney, B. (2006). 'SMS reminders in the UK national health service: an evaluation of its impact on "no-shows" at hospital out-patient clinics', *Health Care Manage Rev*, 31 (2), 130-136.
- Neal, R. D., Hussain-Gambles, M. et al (2005). 'Reasons for and consequences of missed appointments in general practice in the UK: questionnaire survey and prospective review of medical records', *BMC Fam Pract*, 6, 47.
- Reti, S. (2003). 'Improving outpatient department efficiency: a randomized controlled trial comparing hospital and general-practice telephone reminders', *N Z Med J*, 116 (1175), U458.
- Sharp, D. J. & Hamilton, W. (2001). 'Non-attendance at general practices and outpatient clinics', *BMJ*, 323 (7321), 1081-1082.

LIST OF STUDIES INCLUDED

Total number of studies

Level II evidence	1
Level III evidence	2

SEARCH CRITERIA TO BE USED:

Appointments and Schedules
Outpatient Clinics, Hospital/organization & administration/*utilization
Reminder Systems
Patient Compliance